**Commonwealth of Kentucky**
**Division for Air Quality**

# *PERMIT STATEMENT OF BASIS*

Title V revision Proposed Permit No. V-03-037 (Revision 1)
NORTH AMERICAN STAINLESS
GHENT, KENTUCKY
August 8, 2005
BRIAN SMITH, REVIEWER
SREENIVAS KESARAJU, ENGINEERING CONSULTANT
Plant I.D. # 21-041-00034
Application Log # 55756

## SOURCE DESCRIPTION:

North American Stainless, an existing PSD/Title V major source, submitted a permit modification application to its existing V-03-037 permit, and plans to expand the melt shop and modifying several of the downstream production lines. The plant is a PSD/Title V source because criteria air pollutants potential emissions exceed the major source thresholds.

North American Stainless is proposing to modify and expand its production rates with this application. The facility proposes to expand the melt shop capacity to 1.5 million metric tons by installing a second EAF and second AOD. The downstream operations will be expanded to include a new hot rolling line and to increase maximum capacity of other sources. The proposed modifications and all of the projects since the original melt shop are considered to be one continuous project since construction at the facility has not been completed prior the submission of the next application. This application is considered a major modification that is subject to the provisions of PSD regulation.

NAS has submitted the PSD application on April 5, 2004. This permit is being issued as a permit modification.

## PUBLIC AND U.S. EPA REVIEW:

Public notice was placed in the News Democrat on June 29, 2005. Public hearing was held as noticed in the News Democrat on July 27th in the Carroll County Courthouse. There was one comment at the hearing. The Public hearing transcript is attached. The comment period ended on July 29, 2005. There were no comments from the public other than one comment at the public hearing. NAS has submitted two comments. The proposed permit will be sent to U.S. EPA review and the comment period will end 45 days after the receipt. The Division's responses to comments are discussed below.

## Response to Comments:

**<u>COMMENTS FROM PUBLIC HEARING:</u>**
The comment was from Ms. Cindy Thompson. Please see the attached transcript for details.

<u>Division's Response</u>:
The Division acknowledges the comment. The Division assures that the permit is issued with all applicable State and Federal requirements that apply to the modification.

**<u>COMMENTS FROM THE COMPANY:</u>**
Comment 1:
NAS would like the source description of EP-97 be changed to Cold Rolling.

Division's Response:
The requested change is made.

Comment 2:
The body of the description has Tandem rolling and should be changed to Cold rolling.

Division's Response:
The requested change is made.

There are no other comments from public or the company (NAS).

Permit modification [V-03-037(Revision 1)] incorporated the following changes:

1. **Emission Point 01(S-01) – Annealing furnace- AP Line:**
   Annealing furnace capacity has been increased from 65 to 70 mmBTU/hr. The annual operating restrictions have been removed.

2. **Emission Point 02(S-02) – Shot Blaster- Hot AP Line:**
   Two Pangborn shot blasters process capacity have become internally vented with improved air pollution control equipment. This unit has been classified as an insignificant source.

3. **Emission Point 03(S-03 & 07) – Mixed Acid Pickling Lines:**
   Two acid pickling lines (AP1 and AP2) have their emissions vented together to one selective catalytic reduction (SCR) scrubber with NOx emissions limited to 50 ppm.

4. **Emission Point 05(S-05) – Z-Mill #1- Cold Rolling Mill:**
   i. PM emission rates have been reduced from 25 to 5.3 tons per year. (Based on vendor's guarantee)
   ii. Applicable requirements have been incorporated in the permit.

5. **Emission Point 06(S-06) – Annealing Furnace- Cold AP Line:**
   Annual operating limitation for 85 mmBtu/hr furnace has been removed.

6. **Emission Point 08(S-08) – Lime unloading:**

Filter control efficiency has been lowered from 99% to 98%.

7. **Emission Point 11(S-21) – Z-Mill #2- Cold Rolling Mill:**
   i. PM emission rates have been reduced from 25 to 5.3 tons per year. (Based on vendor's guarantee)
   ii. Applicable requirements have been incorporated in the permit.

8. **Emission Point 26(26) – Plate Furnace:**
   The annual operating time has been increased to 8760 hours/year. The self-imposed NOx annual emission limit that was combined for EP26 and 28 has been removed.

9. **Emission Point 28(28) – Plate Pickling:**
   The annual operating time has been increased to 8760 hours/year. The annual emission limits have been removed.

10. **Emission Point 29(29) – Tundish Preheaters:**
    North American Stainless will install three additional tundish preheaters to have a total of four preheaters. Only two preheaters (3.8 mmBtu/hr each) will operate simultaneously. Two will be standby units.

11. **Emission Point 30(30) – SEN Preheaters:**
    North American Stainless will operate ten preheaters (0.16 mmBtu/hr each) simultaneously and will have 5 units as standby units.

12. **Emission Point 31(31) – Alloy System:**
    The addition system that supplies flux materials and ferro alloys to the EAFs and AODs will be increase to obtain a processing rate of 1000 tons per hour. The maximum hourly emission limit will not change.

13. **Emission Point 33(33) – Slag Dump Building:**
    The quantity of slag dumped for transfer of slag will increase to 34.8 tons per hour. The slag is processed by separate permittee.

14. **Emission Point 49-56(49-56) – Ladle Preheaters:**
    North American Stainless will operate a maximum of 9 ladle preheaters simultaneously, and will have two additional standby units. Each will have a maximum burner capacity of 16.8 mmBtu/hr. The total annual capacity will not exceed 12,930 mmBtu/yr.

15. **Emission Points 57(26) and 105(105) – Electric Arc Furnaces (EAF1 & EAF2) and the associated dust handling equipment:**
    North American Stainless has proposed to install a second EAF that will operate when EAF1 is operating. The maximum liquid steel production rates of each EAF will be 133 tons per hour as based on an annual average. The total maximum annual production rate of the combined EAF units will be 1,500,000 metric tons per year of stainless steel casted.
    i. EAF2.
       a. Particulate emissions: 25.71 pounds per hour and 96.654 pounds per ton .
       b. Carbon monoxide: 2 pounds per ton and 266 pounds per hour.
       c. Nitrogen dioxide: 1.00 pound per ton and 133 pounds per hour.
       d. Volatile organic compound: 0.150 pound per ton and 19.95 pounds per hour.

e. Lead: 1.158 pound per ton and 0.309 pound per hour.
f. Graphite electrode sulfur content shall not exceed 0.02%.

ii. Annual Limits EAF1 & EAF2.

a. Particulate emissions: 138.24 tons per year.
b. Carbon monoxide: 1653.36 tons per year.
c. Nitrogen dioxide: 1010.86 tons per year.
d. Volatile organic compound:124.04 tons per year.
e. Lead: 1.66 tons per year.

**16. Emission Points 58(27) and 106(106) – Argon Oxygen Decarburization (AOD1 & AOD2) Vessels:**

North American Stainless has proposed to install a second AOD that will operate when AOD1 is operating. The maximum liquid steel production rates of each AOD will be 133 tons per hour as based on an annual average. The total maximum annual production rate of the combined AOD units will be 1,500,000 metric tons per year of stainless steel casted.

i. AOD2.

a. Particulate emissions: 25.71 pounds per hour and 38.66 pounds per ton.
b. Carbon monoxide: 2.06 pounds per ton and 273.98 pounds per hour.
c. Nitrogen dioxide: 0.58 pound per ton and 76.87 pounds per hour.
d. Lead: 0.470 pound per ton and 0.31 pound per hour.

ii. Annual Limits AOD1 & AOD2.

a. Particulate emissions: 138.24 tons per year
b. Carbon monoxide: 1703 tons per year.
c. Nitrogen dioxide: 447.87 tons per year
d. Lead: 1.70 tons per year

**17. Emission Point 59(28) – AOD Preheaters:**

North American Stainless has proposed to install a second AOD preheater and two additional standby units. Only two AOD preheaters will operate simultaneously. The heat input for each preheater will be 25 mmBtu/hour. The total annual capacity will not exceed 438,000 mmBtu/yr.

**18. Emission Point 61– AP3 Furnace:**

iii. The capacity of the furnace has been reduced to it actual “as-built” capacity.

iv. Emission have been reduced based on it actual emissions and 8760 hours of operation per year.

a. NOx emissions have been reduced from 9.12 to 4.05 lbs/hr, and 26.9 to 17.74 tons per 12 month rolling average.
b. Particulate emissions have been reduced from 0.85 to 0.51 lb/hr, and 2.5 to 2.25 tons per 12 month rolling average.
c. Carbon monoxide emissions have been reduced from 9.39 to 5.67 lb/hr, and 27.7 to 24.83 tons per 12 month rolling average.
d. VOC emissions have been reduced from 0.61 to 0.37 lb/hr, and 1.81 to 1.63 tons per 12 month rolling average.

v. Emission rate calculations have been rectified.

19. **Emission Point 63 – AP3 Cooling Tower:**
North American Stainless reduced the maximum water flow capacity of the permit to the maximum water flow capacity as built. Particulate emissions have been reduced from 0.085 lb per hour to 0.053 lb per hour.

20. **Emission Point 64 – ZMill 3 Cooling Tower:**
North American Stainless reduced the maximum water flow capacity of the permit to the maximum water flow capacity as built. Particulate emissions have been reduced from 0.085 lb per hour to 0.053 lb per hour.

21. **Emission Point 77(77) – Angle Shotblasting:**
The angle shotblaster were constructed to be internally vented with air pollution control equipment. This unit has been classified as an insignificant source.

22. **Emission Point 78(78) – Pickling Line:**
    i. Nitrogen oxide emissions have been reduced from 100 to 75 ppm by volume, 1.44 to 1.08 lbs/hr, and 6.32 to 4.74 tons per 12 month rolling average. (Based on vendor's guarantee)
    ii. Nitrogen Oxide emissions rate calculation has been rectified.

23. **Emission Point 93 – ZMill #4 Cooling Tower:**
North American Stainless reduced the maximum water flow capacity of the permit to the maximum water flow capacity as built. Particulate emissions have been reduced from 0.085 lb per hour to 0.06 lb per hour.

24. **Emission Point 94 – Z-Mill #5-Cooling Tower (a new emission point):**
    i. North American Stainless has proposed to construct a cooling tower in April 2005.
    ii. Applicable regulations and requirements have been incorporated in the permit.
    iii. Maximum Particulate Matter emission rate is 0.06 lbs/hr.
    iv. BACT for cooling tower as determined by the Division is drift eliminator.

25. **Emission Point 95 – Z-Mill #5 (a new emission point):**
    i. North American Stainless has proposed to construct a reversing cold rolling mill in April 2005.
    ii. Applicable regulations and requirements have been incorporated in the permit.
    iii. Maximum Particulate Matter emission rate is 1.5 lbs/hr based on vendor guarantees.
    iv. BACT for Z-mill system as determined by the Division is an integral oil mist eliminator.

26. **Emission Point 96– Z-Mill #6-Cooling Tower (a new emission point):**
    i. North American Stainless has proposed to construct a cooling tower in April 2005.
    ii. Applicable regulations and requirements have been incorporated in the permit.
    iii. Maximum Particulate Matter emission rate is 0.06 lbs/hr.
    iv. BACT for cooling tower as determined by the Division is drift eliminator.

27. **Emission Point 98– Tandem Rolling-Cooling Tower (a new emission point):**
    i. North American Stainless has proposed to construct a cooling tower in April 2005.

ii. Applicable regulations and requirements have been incorporated in the permit.
iii. Maximum Particulate Matter emission rate is 0.06 lbs/hr.
iv. BACT for cooling tower as determined by the Division is drift eliminator.

**28. Emission Point 98 – Cold Mill Miscellaneous-Cooling Tower (a new emission point):**

i. North American Stainless has proposed to construct a cooling tower in April 2005.
ii. Applicable regulations and requirements have been incorporated in the permit.
iii. Maximum Particulate Matter emission rate is 0.06 lbs/hr.
iv. BACT for cooling tower as determined by the Division is drift eliminator.

**29. Emission Point 99 – Grind & Polish #2 (a new emission point):**

i. North American Stainless has proposed to construct a grind & polish line in April 2005.
ii. Applicable regulations and requirements have been incorporated in the permit.
iii. Maximum Particulate Matter emission rate is 1.5 lbs/hr based on vendor guarantees.
iv. BACT for grind & polish line as determined by the Division is an integral oil mist eliminator.

**30. Emission Point 100 – AP#4 -Cooling Tower (a new emission point):**

i. North American Stainless has proposed to construct a cooling tower in April 2005.
ii. Applicable regulations and requirements have been incorporated in the permit.
iii. Maximum Particulate Matter emission rate is 0.06 lbs/hr.
iv. BACT for cooling tower as determined by the Division is drift eliminator.

**31. Emission Point 101 – Hot AP #4 Pickling (a new emission point):**

i. North American Stainless has proposed to construct a pickling line in April 2005.
ii. Applicable regulations and requirements have been incorporated in the permit.
iii. Nitrogen Oxide emission rate is 50 ppm and 4.81 lb per hour.
iv. BACT for AP as determined by the Division is selective catalytic reduction scrubber.

**32. Emission Point 102 – Hot AP #4 Furnace (a new emission point):**

i. North American Stainless has proposed to construct an annealing furnace in April 2005.
ii. Applicable regulations and requirements have been incorporated in the permit.
iii. Emissions rates are 0.99 lb/hr of particulate, 7.8 lb/hr of nitrogen oxide, 10.92 lb/hr of carbon monoxide, and 0.72 lb/hr of volatile organic compounds.
iv. BACT for AP as determined by the Division are combustion of natural gas and dry low NOx burners.

**33. Emission Point 103 – Acid Recovery Roaster (a new emission point):**

i. North American Stainless has proposed to construct an acid recover roaster in April 2005.
ii. Applicable regulations and requirements have been incorporated in the permit.
iii. Emissions rates are 0.30 lb/hr of particulate, 3.9 lb/hr of nitrogen oxide, 1.95 lb/hr of carbon monoxide, and 0.21 lb/hr of volatile organic compounds.
iv. BACT for the roaster as determined by the Division is combustion of natural gas and dry low NOx burners.

v.

34. **Emission Point 104 – Acid Recovery Line (a new emission point):**
    i. North American Stainless has proposed to construct an acid recover system in April 2005.
    ii. Applicable regulations and requirements have been incorporated in the permit.
    iii. Nitrogen Oxide emission rate is 50 ppm and 0.48 lb per hour.

35. **Emission Point 107 – EAF #2 -Cooling Tower (a new emission point):**
    i. North American Stainless has proposed to construct a cooling tower in April 2005.
    ii. Applicable regulations and requirements have been incorporated in the permit.
    iii. Maximum Particulate Matter emission rate is 0.17 lbs/hr.
    iv. BACT for cooling tower determined by the Division is drift eliminators.

36. **Emission Point 108 – Melt Shop #2 -Cooling Tower (a new emission point):**
    i. North American Stainless has proposed to construct a cooling tower in April 2005.
    ii. Applicable regulations and requirements have been incorporated in the permit.
    iii. Maximum Particulate Matter emission rate is 0.06 lbs/hr.
    iv. BACT for cooling tower determined by the Division is drift eliminator.

37. **Emission Point 110 – Boiler #3-Standby Unit (a new emission point):**
    i. North American Stainless has proposed to construct a natural gas-fired boiler in April 2005.
    ii. Applicable regulations and requirements have been incorporated in the permit.
    iii. Unit can only be operated if Boiler #1 or #2 is not operating.

38. **Emission Point 111 – AP #4 Shot Blaster (a new emission point):**
    i. North American Stainless has proposed to construct an internally vented shot blaster for AP #4 in April 2005.
    ii. Unit has been identified as insignificant source in the permit.

39. **Emission Point 112 – Refractory Dumping (a new emission point):**
    i. North American Stainless will increase the quantity of refractory brick being removed and placed in dumpsters to transfer it offsite.
    ii. Applicable regulations and requirements have been incorporated in the permit.

40. **Emission Point 113 – Tundish Dryer (a new emission point):**
    North American Stainless will install three tundish dryers to have a total of three dryers. Only two dryers (2.4 mmBtu/hr each) will operate simultaneously. One will be a standby unit.

41. **Emission Point 114– Angle Pickling Line #2:**
    i. North American Stainless has proposed to construct an angle pickling line #2 in April 2005.
    ii. Applicable regulations and requirements have been incorporated in the permit.
    iii. Maximum NOx emission rate is 75 ppm, 1.08 lbs/hr, and 4.74 ton per year.
    iv. BACT for angle pickling as determined by the Division is chemical scrubber.

## 42. BACT Evaluation

### EAF NO. 2

The second EAF is designed with similar controls as the original EAF. NAS will operate the EAF as a batch mode process that will charge, melt, and tap stainless steel using a minimum of stainless steel scrap. In general, clean scrap and lime alloys, and recovered metal from slag will be charged. After charging, the scrap will be further melted. The emissions from the EAF will be captured using both the fourth hole evacuation (or direct evacuation control (DEC)), and canopy. The fourth hole evacuation consists of ductwork attached to the fourth hole in the furnace roof which draws emissions to the EAF particulate control system. A canopy hood will be installed to capture emissions during charging and tapping.

**Control of NOx -** The BLIS database and U.S. EPA documents were searched to identify add-on NOx control technologies. No add-on control equipment was found in the BLIS database for NOx. Good engineering practices were identified as the NOx control.

| State | Facility Name | Permit Date | Control Description | BACT Limit |
|---|---|---|---|---|
| Texas | Nucor Corp | 1/15/2003 | Good Engineering Practice | 0.3 lb/ton |
| Alabama | Corus Tuscaloosa | 6/03/2003 | - | 0.35 lb/ton |
| Colorado | CF&I Steel | 6/21/2004 | Good Combustion Practice | 0.15 lb/ton |
| Indiana | Nucor Steel | 11/21/2004 | - | 0.35 lb/ton |

Other EAFs in the steel industry use the same control technology as proposed/used at NAS. However, the NOx emission limit of 0.35 lb NOx/ton of carbon steel (as presented in the table above) is not applicable since this limit is developed for the melting of carbon steel. Carbon steel has different chemical composition and physical/thermal properties than stainless steel which influence the NOx emission rates and melting practices.

NAS proposes to use BACT that is consistent with other EAFs in the U.S. However, the NOx emission limits for carbon steel EAFs are not applicable for stainless steel EAFs. The NOx emission rate of 1.32 lb NOx/ton of stainless steel that was determined to be BACT for EAF1 remains applicable for EAF2.

**Control of CO -** CO formation occurs when the carbon in the steel, and the carbon in the electrode reach the oxygen from the ambient air. CO is generated during charging, melting, and tapping of the heat cycle. During melting and refining, the emissions are released into the DEC.

The BLIS database and literature identified direct evacuation controls as only CO control options. For years 2003 and 2004, the BACT emission limits range from 2 lb/ton to 4.8 lb/ton. Below is a summary of the BACT limits

| State | Facility Name | Permit Date | Control Description | BACT Limit |
|---|---|---|---|---|
| Texas | Nucor Corp | 1/15/2003 | Good Combustion Practice | 2 lb/ton |
| Ohio | Timken Co. Faircrest | 2/20/2003 | 4$^{th}$ Hole | 4.8 lb/ton |
| Alabama | Corus Tuscaloosa | 6/03/2003 | Direct Evacuation Canopy | 2 lb/ton |
| Colorado | CF&I Steel | 6/21/2004 | Process Controls, etc | 2 lb/ton |
| Indiana | Nucor Steel | 11/21/2004 | Direct Shell Evacuation | 2 lb/ton |

While no CO controls have been identified in the BLIS database, other potential BACT alternative CO control technologies may include:

| Control Technology | Determination |
|---|---|
| **Duct burners** | **Not Suitable**, The purpose of installing duct burners is to maintain the temperature of the captured flue gas to enhance combustion of CO to carbon dioxide. As a result of the duct burner, the flue gas as it entered the baghouse would be elevated which may cause thermal destruction of the filter bags in the downstream baghouse. Since the effectiveness of duct burners for the destruction of CO has not been demonstrated to date, and the potential for thermal destruction of the baghouse, duct burners are not suitable. |
| **Flaring of CO emissions** | **Not Suitable**, the flaring of CO emissions requires an excessive use of an auxiliary fuel due to the large volumetric flow rate of the flue gas and would generate the by-products of the combustion. |
| **CO oxidation catalyst / Catalytic incineration** | **Not Suitable**, catalytic poisoning and sizable regeneration costs will make it an expensive proposition |
| **Thermal incineration** | **May be suitable but not selected**; thermal incineration requires the use of auxiliary fuel to burn the flue gases causing oxidation to occur. Due to the lack of application in the steel industry, this control alternative has been eliminated from further consideration in the BACT analysis. |

The BACT for CO will be an emission limit of 2 lb/ton.

**Control of PM -** Particulate emissions are generated throughout the heat cycle. To capture PM emissions during melting, the DEC or fourth hole duct will be used. For the remaining portion of the heat cycle, emissions will be captured by the doghouse and canopy hood. The captured EAF flue gases will be vented through a baghouse with a total flow of 1,000,000 acfm. The BLIS database was searched to identify other PM control technologies. Based on the BLIS database, baghouses with DEC are considered BACT for control of EAF PM emissions. In general, BLIS database identifies PM BACT emissions ranging from 0.002 gr/dscf to 0.005 grains/dscf. The most recently permitted units are summarized below.

| State | Facility Name | Permit Date | BACT Limit |
|---|---|---|---|
| Texas | Nucor Corp | 1/15/2003 | 0.005 gr/dscf |
| Alabama | Corus Tuscaloosa | 6/03/2003 | 0.0035 gr/dscf |
| Colorado | CF&I Steel | 6/21/2004 | 0.0052 gr/dscf |
| Indiana | Nucor Steel | 11/21/2004 | 0.002 gr/dscf |

BACT for controlling PM emissions from the EAF is proposed as utilizing fabric filters/baghouse. NAS proposes to install a baghouse with DEC to control EAF emissions at a limit of 0.003 gr/acfm.

**Control of Lead:**
Lead is listed in 401 KAR 51:017 with a significant net emission rate of 0.6 tpy. The BACT for lead is Scrap management practices and utilization of fabric filter/baghouse. There is also an emission limit of 0.309 pound per hour.

## AOD NO. 2

The BLIS database identified one facility, Nucor Steel with an AOD vessel. The emission point consisted of more than just an AOD, but an EAF, desulfurization, and other processes as well. Below is a summary of the emission limits and controls for Nucor Steel located in Indiana with a permit date of 11/21/2003.

| Pollutant | Control Description | BACT Limit |
|---|---|---|
| NOx | Natural Gas-Fired Burners | 0.35 lb/ton |
| CO | Direct Shell Evacuation | 2 lb/ton |
| PM10 | Baghouse | 0.0052 gr/dscf |
| VOC | Scrap Management | 0.09 lb/ton |

North American Stainless proposes to similar BACT limits as the EAF2, however, NAS will not emit any VOCs from the AOD since VOCs would have already been processed and released from the EAF. Below is a summary of the BACT limits and control equipment.

| Pollutant | Control Description | BACT Limit |
|---|---|---|
| NOx | Good Engineering Practices | 0.578 lb/ton |
| CO | Good Engineering Practices | 2.06 lb/ton |
| PM10 | Baghouse | 0.003 gr/dscf |

## MELT SHOP PREHEATERS AND DRYERS

All preheaters and dryers will be natural gas-fired. The preheaters and dryers will produce by-products of combustion such as NOx, CO, and PM. According to the BLIS database, low NOx burners and good combustion practices when burning natural gas are considered BACT for preheaters and dryers. North American Stainless proposes to combust natural gas and use good combustion practices when operating the preheaters and dryers.

## COOLING TOWERS

Cooling towers emit particulate matter. The BLIS database identified drift eliminators as BACT for cooling towers. North American Stainless proposes to use drift eliminators for the cooling towers.

## ANNEALING FURNACES

The proposed annealing furnaces will be natural gas fired. The emissions associated with the furnace will be $PM_{10}$, $NO_x$, CO, VOCs, $SO_2$, and HAPs.

**Control of $NO_x$ -** The Division has looked at several control technologies for BACT analysis. The following table lists the control technologies with the advantages and disadvantages:

| Control Technology | Determination |
|---|---|
| **Selective catalytic reduction** | **Not Suitable**, The SCR system is not an appropriate control device for non-steady state processes. Due to difficulties with variable operating conditions and catalyst poisoning, use of SCR on annealing furnaces is currently technologically infeasible. |
| **Selective non-catalytic reduction** | **Could be Used**, SNCR is applicable in applications where a temperature suitable for a favorable reaction is achievable. SNCR has not been used for any steel processes due to varying temperatures. |
| **Staged combustion** | **Could be Used**, it can be implemented using conventional burners by staging the combustion in the furnace or firebox rather than within the burner itself as is done with low-$NO_x$ burners. |
| **Low-$NO_x$ burners** | **Selected BACT**; Best suited for natural gas-fired annealing furnaces; For similar sources, the LAER/BACT has typically been the Low NOx Burners. |

Low-$NO_x$ burners are the most widely used and most appropriate controls for $NO_x$ from annealing furnaces. The annealing furnaces and their proposed NOx emission rates are summarized below.

| Furnace Description | Heat Input Capacity (MMBtu/hr) | NOx Emission Limit (lb/MMBtu) |
|---|---|---|
| Cold Line - AP1 | 85 | 0.06 |
| Cold Line – AP2 | 70 | 0.06 |
| Cold Line – AP3 | 67.5 | 0.06 |
| Hot Line – AP4 | 130 | 0.06 |
| Plate Line | 16.5 | 0.0845 |

**Control of CO –** Based on a search of the BLIS database, BACT for controlling CO emissions from the annealing furnaces is proposed to be good combustion practices when burning natural gas as proposed by North American Stainless.

**Control of PM -** Based on a search of the BLIS database, BACT for controlling PM emissions from the annealing furnaces is proposed to be the use of natural gas as proposed by North American Stainless.

## PICKLING SECTION

Emissions from the pickling section are the result of the reaction between metal oxides and nitric acid. The greater the processing rate (i.e., metal surface), the more metal oxides will react with the nitric acid to generate NOx emissions.

Potential $NO_x$ treatment options for the pickling section include catalytic reduction with ammonia, gas scrubbing with sodium hydroxide, sodium hydrosulfide, or hydrogen peroxide, or the addition of hydrogen peroxide or urea to the pickling bath. These options treat $NO_x$ emissions either at the treatment site or by suppression of $NO_x$ at the source. The BLIS database presents wet scrubbing as BACT with NOx emissions ranging from 100 ppmvd to 175 ppmvd.

NAS prefers to use hydrogen peroxide and/or urea as a scrubbing agent inside the acid baths for pickling lines with lower processing rates. For the proposed Long Products Angle Pickling Line, NAS is proposing a BACT emission limit of 50 ppm NOx as BACT.

## MATERIAL HANDLING AND STORAGE

Lime is unloaded into the CM lime silos for use at the wastewater treatment plant. The lime enters the silo and is feed as a slurry to the wastewater treatment. NAS operates the lime silos with a total holding capacity of 300,000 lb. (100,000 lb. each). To minimize fugitive emissions, the emissions from the baghouses will feed into the lime slurry tank.

BACT for controlling PM emissions from material handling and storage will be the use of building enclosures and particulate filters (baghouses) where applicable.

**43. Air Quality Impact Analyses**

Pursuant to Regulation 401 KAR 51:017, Section 9, an application for a PSD permit shall contain an analysis of ambient air quality impacts in the area that the proposed facility will affect for each pollutant that it will have the potential to emit in significant amounts as defined in Section 1 of 401 KAR 51:001. The purpose of this analysis shall be to demonstrate that allowable emissions from the proposed source will not cause or contribute to air pollution in violation of:

i. A national ambient air quality standard in an air quality control region; or
ii. An applicable maximum allowable increase over the baseline concentration in an area.
   a. With respect to a pollutant for which no ambient air quality standard exists, the analysis shall contain the air quality monitoring data the Division determines necessary to assess ambient air quality for that pollutant in an area that the emissions of that pollutant will affect.
   b. For pollutants (other than nonmethane hydrocarbons) for which a standard does exist, the analysis shall contain continuous air quality monitoring data gathered to determine if emissions of that pollutant will cause or contribute to a violation of the standard or a maximum allowable increase.

| Pollutant | Significant Emissions Rate[(1)] (TPY) | Significant Net Emissions Increase (TPY) |
|---|---|---|
| Carbon Monoxide | 100 | 2598.6 |
| Nitrogen Oxides | 40 | 1144.6 |
| VOC (for ozone) | 40 | 253.1 |
| $PM_{10}$ | 15 | 228.7 |

[(1)] Significant emission rate given in Regulation 401 KAR 51:107, Section 22.

As indicated in the table above, the proposed modification will result in a significant net emissions increase in excess of the significant net emission rates for PM10, carbon monoxide, VOC, and nitrogen oxides. The source was therefore required to conduct an air quality impact analysis for PM10, carbon monoxide, nitrogen oxides, and VOCs.

Note on New Ambient Air Quality Standards:
Effective September 16, 1997, U.S. EPA promulgated new and revised ambient air quality standards for ozone and particulate matter. These have been summarized in the table below:

| Pollutant | Existing Standard | New Standard |
|---|---|---|
| Ozone ($O_3$) | 0.12 ppm (1-hour average) | 0.08 ppm (8-hour average) |
| $PM_{2.5}$ | None | 15 μg/m$^3$ (annual average) |
| | None | 65 μg/m$^3$ (24-hour average) |
| $PM_{10}$ | 50 μg/m$^3$ (annual average) | 50 μg/m$^3$ (annual average) |
| | 150 μg/m$^3$ (24-hour average) | 150 μg/m$^3$ (24-hour average)* |

*Although the standard is the same, the form has been revised to 99th percentile concentration (3-year average).

To address the applicability of these new standards to the PSD review of North American Stainless's proposed modifications, the Division has relied upon the following guidance provided by U.S. EPA:

i. Memorandum from John S. Seitz, Director, Office of Air Quality Planning and Standards - *Interim Guidance for Implementing Major New Source Review (NSR) Requirements for the Existing and New National Ambient Air Quality Standards for Ozone and Particulate Matter (PM)*.
ii. Memorandum from John S. Seitz, Director, Office of Air Quality Planning and Standards - *Interim Implementation of New Source Review Requirements for $PM_{2.5}$*.

Based on the guidance provided in these memoranda, the Division has reviewed the ambient air quality analysis for this facility taking into consideration the following:

i. Given the significant technical difficulties that exist with respect to $PM_{2.5}$ emissions estimation, and modeling at this time, $PM_{10}$ has been used as a surrogate for $PM_{2.5}$ in meeting the NSR requirements. For the purposes of this review, compliance with the $PM_{10}$ standards has been deemed to be compliance with the $PM_{2.5}$ standards.
ii. Because the revised 24-hour $PM_{10}$ standard is less stringent than the existing standard, the ambient air quality analysis based on the existing standard was the only analysis required. This analysis was deemed to be adequate for satisfying both existing and revised standards.

a. Modeling Methodology

The application for the proposed modifications contains an air dispersion modeling analysis for the criteria pollutant ($PM_{10}$) to determine the maximum ambient concentrations attributable to facility emissions for that pollutant for comparison with:

(1) The ambient significant levels (SIL) found in Table C-4 of the New Source Review Manual (Draft October 1990);
(2) The significant monitoring concentrations (SMC) found in 401 KAR 51:017, Section 24;
(3) The PSD increments and National Ambient Air Quality Standards (NAAQS) found in 401 KAR 51:107, Section 2 and 401 KAR 53:010, Ambient air quality standards, respectively (see also Note on new standards above).

Based on accepted U.S. EPA procedures, if the maximum predicted impacts for any pollutant are below the SILs, then it is assumed that the proposed facility cannot cause or contribute to a violation of the PSD pollutant increments or the national ambient air quality standards (NAAQS). Therefore, no further modeling would be required for such a pollutant. The applicant may also be exempted from the ambient monitoring data requirements if the impacts are below the SMCs.

The EPA's Industrial Source Complex Short Term model (ISCST3, Version) was used in the analysis. The ISCST3 model fulfills the requirements of Supplement C of the Guideline on Air Quality Models (Appendix W to 40 CFR Part 51). All parameters used in the modeling analysis for each pollutant have been found to be satisfactory and consistent with the prescribed usage for this model. Per EPA guidance, the ISCST3 model was run in sequential hourly mode using five consecutive years of meteorological data. The nearest National Weather Service (NWS) station is the Covington/Greater Cincinnati Airport in Kenton County, Kentucky. Surface observations collected between 1987 and 1991 at this station were used in the dispersion models. In addition, the nearest upper-air station was the Wright Patterson Air Force base in Dayton, Ohio. Coincident observations from this station were used in the modeling analyses.

b. Modeling Results - Class II Area Impacts

The PSD requirements provide for a system of area classifications that determine the amount of growth allowed before significant air quality deterioration is deemed to occur. Class I areas have the smallest increments and allow the least growth. The impacts of the proposed project on the nearest Class I areas will be discussed in the next section. The proposed facility will be located in a Class II area that allows moderate growth. The results of the modeled impacts on the Class II have been presented in the table below:

| Pollutant | Averaging Period | Calculated[1] Impact ($\mu g/m^3$) | SIL[2] ($\mu g/m^3$) | SMC[3] ($\mu g/m^3$) | PSD Class II Increments ($\mu g/m^3$) |
|---|---|---|---|---|---|
| $PM_{10}$ | 24-hour | 10.86 | 5 | 10 | 30 |
| | Annual | 1.54 | 1 | NA | 17 |
| NOx | Annual | 15.77 | 1 | 14 | 25 |
| CO | 1-hour | 648.3 | 2000 | - | - |
| | 8-hour | 248.3 | 500 | 575 | - |

(1) Maximum of 1987 through 1991 modeling
(2) Significant Impact Level [Ref: 40 CFR 51.165 (b) (2)]
(3) Significant Monitoring Concentration [Ref: 401 KAR 51:017]

The CO impacts are less than SIL and therefore no further modeling was performed for CO.

b. Preconstruction Monitoring

The maximum predicted impacts for $PM_{10}$ and NOx exceed their corresponding SMCs. Preconstruction ambient air quality monitoring was required for these pollutants.

c. Full Impact Analysis

An emission inventory of all major sources located in the vicinity of the plant was obtained from the Kentucky Division of Air Quality, Ohio EPA, and Indiana Division of Environmental Management. Due to the large number of NOx sources in KY, a 20-D determination was used for those sources located in KY. For Kentucky, the worst-case emissions were assumed for many of the facilities not adjacent to NAS. Actual emissions for existing sources at NAS were used. The 20-D method was developed by the North Carolina of Environmental Management as a means to eliminate insignificant sources from modeling analyses. For Ohio, all NOx sources within 50 km were modeled. Since only the potential emission rates were provided by Ohio EPA, these emissions were assumed for both the PSD increment as well as the NAAQS modeling. Indiana DEM provided both input files for the PSD increment and NAAQS modeling. For the NOx analyses, the whole SIA area located within 17 km of the facility was modeled even though many of the receptors were not significantly impacted. That is, concentrations for much of the 17-km radius were less than 1 $\mu g/m^3$.

For the PM10 modeling, the PSD and NAAQS inventory was developed from Kentucky emission inventory system. The permit application of Meritor Heavy Braking Systems was used as the basis of the modeling information for that source. For the PSD increment and NAAQS compliance demonstrations, only receptors that were significantly impacted were modeled. For the PM10 PSD increment and NAAQS compliance demonstrations, only those receptors known to be significantly impacted were modeled for specific dates and/or years.

d. Modeling Results

A PSD increment is the maximum increase that is allowed to occur above a baseline concentration for a pollutant. The results of the increment consumption analysis indicate that when NAS has a significant impact, the PSD increments are not exceeded. Below is a summary of the PSD analyses:

| Pollutant | Averaging Period | Increment Consumed ($\mu g/m^3$) | PSD Class II Increments ($\mu g/m^3$) |
|---|---|---|---|
| NOx | Annual | 23.73 | 25 |
| $PM_{10}$ | 24-hour | 23.75 | 30 |
| | Annual | 5.07 | 17 |

As specified in 401 KAR 51:017, Prevention of Significant Deterioration of Air Quality, no concentration of a regulated pollutant shall exceed either its secondary or primary ambient air quality standards for that pollutant. The modeling with ISCST3 indicates that the NAAQS for NOx and PM10 were not exceeded when NAS has a significant impact. Below is a summary of the NAAQS analyses.

| Pollutant | Period | Background Concentration ($\mu g/m^3$) | Impact All Sources ($\mu g/m$) | Predicted Ambient Impact ($\mu g/m^3$) | NAAQS ($\mu g/m^3$) |
|---|---|---|---|---|---|
| NOx | Annual | 23 | 26.69 | 49.69 | 100 |
| $PM_{10}$ | Annual | 28.5 | 9.92 | 38.42 | 50 |
| | 24 hour | 63 | 46.52 | 109.52 | 150 |

[1] Background concentrations for PM10 were based on NAS Title V permit application. The NOx background concentration was based on NAS's onsite ambient air monitoring.

e. Ozone NAAQS and preconstruction monitoring:

Dispersion modeling is generally not feasible for the PSD air quality impact analysis for ozone. The Division is going to rely upon ambient ozone monitoring data to determine whether any air quality problems exist in the area of the proposed new or modified PSD source. In the event that ambient ozone data indicates violations of the ozone standard, then the source must mitigate its ambient impact so as not to cause or contribute to the violations. Preconstruction monitoring will be required for ozone if VOC emissions from the modification increase by more than 100 TPY. However if there is adequate monitoring in the area that meets the criteria for PSD monitoring no additional preconstruction monitoring will be needed.

As specified in 401 KAR 51:017, Prevention of Significant Deterioration of Air Quality, no concentration of a regulated pollutant shall exceed either its secondary or primary ambient air quality standards for that pollutant. The Division has used the monitoring data from ambient monitors in Boone County and Oldham County for reviewing the ambient ozone monitoring data to evaluate current ozone concentration levels relative to the standard (8-hr standard). Boone County is downwind from Carroll County and Oldham County is upwind. The monitoring data for period "2004-2005 May" is used. There were no violations recorded of 8-hr NAAQS for ozone at these monitors in the period of review.

| | | Boone County | | | Oldham County | | | |
|---|---|---|---|---|---|---|---|---|
| | | 4th Highest Maximum | | | 4th Highest Maximum | | | |
| Pollutant | Period | 2004 | 2005 till May | 2005 3 yr avg | 2004 | 2005 till May | 2005 3 yr avg | NAAQS 8-hr (ppm) |
| Ozone | 8 hour | 0.070 | 0.073 | 0.073 | 0.076 | 0.079 | 0.079 | 0.08 |

f. Modeling of Lead emissions

Air dispersion modeling has been completed to evaluate the potential impact of the potential lead emissions for NAS. The model has been executed with the same default parameters, building data, and receptor grids as used for the CO, NOx, and PM10 evaluations.

Lead was modeled for 3-month calendar year averaging periods for years 1987 through 1991. For each year, four modeling runs were executed. Based on the ISCST3 modeling of lead, the maximum ambient air concentration for 1987 through 1991 (0.006 ug/$m^3$) for NAS was less than the PSD De Minimis Impact Level (to support ambient monitoring exemption) of 0.1 ug/$m^3$. For this reason, no ambient air monitoring was required for NAS.

Additional modeling of lead was conducted to demonstrate compliance with the National Ambient Air Quality Standard (NAAQS) for lead (1.5 ug/$m^3$). The results of the modeling indicated that the maximum 3-month average concentrations for the area surrounding NAS were approximately one to two orders of magnitude less than the NAAQS. The maximum lead concentration (as presented in Table 4) for 1997 through 1991 was 0.149 ug/$m^3$.

g. Modeling Results - Class I Area Impacts

The nearest Class I area is Mammoth Cave National Park located 180 kilometers south-southwest from the site. The modeling has been performed to see if the proposed modification would have a significant impact on that Class I area. The maximum Class I area impacts from the expansion at North American Stainless are predicted to be less than the SILs. Since the ISCST3 model was used to determine this impact, this value should be very conservative since ISCST3 tends to over-estimate significantly when modeling sources over 50 km away from the receptor grid. Therefore, no further analysis of Class I area ambient impact is required for this proposed modification.

| Pollutant | Averaging Period | Calculated[1] Impact (µg/m$^3$) | SIL[2] (µg/m$^3$) |
|---|---|---|---|
| $PM_{10}$ | 24-hour | 0.067 | 0.3 |
| | Annual | 0.003 | 0.2 |
| NOx | Annual | 0.019 | 0.1 |
| CO | 1-hour | 15.26 | - |
| | 8-hour | 2.9 | - |

[1] Maximum of 1987 through 1991 modeling

## 44. <u>Additional Impact Analyses</u>

a. *Growth Analysis* - The changes to facility are not expected to have any growth-inducing effects on the locales surrounding the site and, therefore, on the local services and facilities. The staffing for the construction jobs can be expected to be locally hired and short-termed. One hundred seventy-five people will be needed in addition to the existing workforce of 1100 employees at the facility after construction. The air impact due to the associated residential growth will be in the form of additional automobile and home furnace emissions, which will be dispersed over a large area and therefore, are also anticipated to have negligible impact. Commercial growth is anticipated to occur at a gradual rate in the future. The increase in commercial growth associated with the facility will be added to the background pollutant concentrations. Based on the maximum predicted concentrations associated with the facility, there is sufficient air resource available for future development in Carroll County, Kentucky.

b. *Soils and Vegetation Impacts Analysis* - The maximum predicted ambient concentrations due to the existing sources and proposed modification at North American Stainless are below the ambient air quality standards and are not expected to have any significant impacts on soil and vegetation in the area.

**c.** *Visibility Impairment Analysis* - The nearest Class I area (Mammoth Cave National Park) is located approximately 180 kilometers south south-west of the North American Stainless. Impacts on the visibility in this Class I area are expected to negligible. However, a Level 1 visibility screening analysis was conducted to evaluate the potential for significant impact at Mammoth Cave National Park. This Level 1 analysis was performed using the Calpuff model for evaluation of visibility impacts. The results indicate that the proposed expansion at NAS will not adversely affect visibility at Mammoth Cave National Park.